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Watching More Than The Discovery Channel:

Export Cycles and Diversification in Development

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Abstract

This paper examines the export performance of 99 countries over 1995-2004 to understand the relative roles of export growth through "discovery" of new products and growth during post-discovery phases of the export product cycle -- acceleration and maturation -- in existing markets and expansion into new geographic markets. The authors find that expanding existing products in existing markets (growth at the intensive margin) has greater weight in export growth than diversification into new products and new geographic markets (growth at the extensive margin). Moreover, growth into new geographic markets appears to be more important than discovery of new export products in explaining export growth. Of particular importance is whether an exporting country succeeds in reaching more national markets that are already importing the product it makes. This geographic index of market penetration is a powerful explanatory variable of export performance. This suggests that governments should not focus solely or even primarily on the discovery channel, but also seek to identify and address market failures that are constraining exporters in subsequent phases of the export cycle

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This paper—a product of the International Trade Department—is part of a larger effort in the department to improve understanding of the factors that contribute to successful export diversification and export growth. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Aimee Yuson, room MC2-410, telephone 202-473-8922, fax 202-522-7551, email address ayuson@worldbank.org. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The authors may be contacted at pbrenton@worldbank.org and rnewfarmer@worldbank.org. August 2007. (26 pages)

WATCHING MORE THAN THE DISCOVERY CHANNEL: EXPORT CYCLES AND DIVERSIFICATION IN DEVELOPMENT

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Rapid and sustained economic growth is closely associated with a fast pace of export growth. Integrating into the global economy can provide new sources of productivity gains through trade, new investment, and access to technology (see Spence, 2007). On the import side, access to the widest variety of products at global prices bolsters productivity growth as domestic firms find the best match of intermediate inputs for the technology they use in their production (Broda and Weinstein (2006)). Imports of capital goods are an important source of technology enabling developing countries to move closer to the global technology frontier (Helpman, 2004: chapter 5) and access to imports allows domestic entrepreneurs the scope to identify minor product innovations that lead to new varieties of products.

On the export side, export growth is a key driver of GDP growth given limited domestic demand. In many developing countries shifting resources into exports has a strong impact on growth since export sectors have higher productivity and within sectors exporting firms tend to be more productive than non-exporters. In fact, the 16 fastest growing economies over the 25 year period to 2005 experience export growth that was substantially more rapid than average for all developing countries.

Rapid export growth is closely associated with diversification into new products. It is no accident that today's low-income countries are generally more dependent on a relatively few products for their exports (Bora, et al, 2004). This lack of diversification in exports is related to the lack of diversification of economies at lower levels of income; indeed, Imbs and Wacziarg (2003) have shown that economies tend to become more diversified until they move into the upper reaches of middle-income status, after which, trends towards increased specialization begin to dominate. The associated concentration of exports means that when prices of their particular exports on global markets fall, they often suffer terms of trade shocks that adversely affect investment and even consumption (see Janson, 2004). Moreover, volatility in income terms of trade has depressed long-term growth (Lutz and Singer 1994; Easterly and Kraay, 2000). The absence of diversification prevents opportunities for productivity growth through the introduction and expansion of new activities.

Recent literature has focused on the "discovery process" of exporting (Hausmann-Rodrik, 2003). It contends that firms in developing economies tend under-invest in discovery because would-be first movers into export markets fear their initially high returns would be eroded by subsequent new entry, resulting in an under-investment in searching for new export activities. This hypothesis of "super-easy entry" is seen as the key market failure impeding diversification. If this could be overcome, then presumably diversification would increase and exports would grow more rapidly.

A policy corollary is that governments can usefully deploy industrial policies to stimulate discovery and hence diversification. Klinger and Lederman (2004) find that overall export diversification increases at low levels of development. They create a model to test the hypothesis that the threat of imitation inhibits the rate of "discovery". They proxy barriers to entry by using the average time it takes to register a formal firm (from the *Doing Business* surveys, World Bank), and find that indeed barriers to entry are associated with increased discovery and diversification. From this they deduce that some type of subsidy to the diversification process is warranted.

This view of discovery may eventually be sustained by subsequent research. However, there are intuitive reasons to continue investigation of this hypothesis. First, it is not clear that aggregate data affecting all markets apply equally across industries and hence to the individual industry failing to export. Second, anecdotal evidence often points to the opposite conclusion: that imitating entry broadens the market through agglomeration and industrial level economies of scale affecting key inputs and lowers transportation costs for all firms in the industry. Finally, even if market failures constrain discovery, it is not clear that policy makers should devote scarce resources to this problem – if discovery turns out to be a small part of the export growth problem.

This last concern is the point of departure for this paper. The discovery channel is only one way of looking at the export diversification cycle. This paper attempts to look at the

exporting process in a broader light. The export process *for a product* can be usefully thought of as comprised of four phases analogous to the product cycle[1]:

- *discovery* in which firms seek out profitable activities abroad and launch a new product into a foreign market;
- a *rapid growth* phase in which successful firms reinvest and expand into existing and new geographic markets;
- a *maturation* phase in which products experience widespread competition, and successful firms focus on maintaining market share by improving quality and productivity;
- and a *declining phase* in which successful firms exploit existing products for rent that are invested in new activities.

This paper asks the policy question: Is the discovery process sufficiently binding that it should be the primary concern of policy makers wishing to accelerate exports rather than other parts of the export cycle? We can disaggregate this question into component questions: Are countries with rapidly growing exports performing well because they are intensifying existing exports to existing markets, because they are bringing new products to market, or because they are extending their markets to third countries more rapidly? Said differently, controlling for structural and other policy issues, is export performance through growth at the extensive margin more related to success or failure in the discovery phase or national efforts (private and public) in subsequent phases?

To answer these questions, a first section decomposes export performance of a wide range of developing countries into changes at the intensive and extensive margins (including introduction of new products and introduction of existing products into new geographic markets). A second section examines the relative performance of countries in exploiting potential demand among importing countries for its extant export portfolio—creating an index of export market penetration. A third section looks at determinants of export performance as a function of structural, policy and national effort at extensive margins.

[1] See Vernon (1966), Wells (1971), and more recently, Feenstra and Rose (2000).

A final section draws some conclusions. The headlines include: Most export growth for developing countries came through intensifying growth of existing products to existing markets in the 1995-2004 period under study. Poorly performing countries were in general able to keep pace with rapidly growing countries in intensifying growth, but experienced a higher death rate of products, so their overall growth at the intensive margin was discernibly slower. At the extensive margin – growth through introduction of new products and through selling existing products to new geographic markets -- was driven more by diversification into new geographic markets during the acceleration and maturation phases than by introduction of new products in the discovery phase. This suggests that governments should look for market failures that are constraining export growth much more broadly than just in the discovery phase.

Growth of Developing Countries Exports: The Contributions of the Extensive and Intensive Margins

We begin with a decomposition of the growth of exports of 99 developing countries to 102 developed and developing country markets. The purpose is to identify the extent to which export growth has been driven by changes to existing bilateral flows (the intensive margin) or by new exports, either of products not formerly exported or existing products to new markets (the extensive margin).

Data considerations

A careful analysis of export growth and diversification requires trade data that are consistent across countries and products at a meaningful level of commodity disaggregation. It is generally accepted that import data are more reliable than export data. This is especially the case for developing countries. Hence to investigate export growth of developing countries we use mirror statistics from importing countries and seek to use data for the largest number of importers that report over a period suitable for an investigation of export growth. At the same time we require detailed commodity data from a classification that is not subject to major changes that could influence the results. In other words zeros can appear and disappear, as trade volumes allocated to a particular code can change owing to changes in classification. In practice there is a trade-off between the amount of product

detail, sensitivity to changes in classification and the number of countries reporting imports.

Looking at data availability in the COMTRADE database (via WITS) showed that (for a recent 10 year growth period) the largest sample of importers could be obtained for data reported according to the third revision of the Standard International Trade Classification (SITC) (102 countries reported in both 1995 and 2004). A slightly smaller number of countries (95) reported import data according to the Harmonized System (HS) in both of these years.[2] The data reported under the HS is available at a slightly more detailed level of commodity disaggregation (5016 products at the 6 digit level) than that under the SITC (3118 products at the 5 digit level). However, the HS has been subject to two revisions over the sample period in 1996 and 2002, while there have been no revisions to the SITC.[3] While data are concorded to a consistent version of the HS, different countries have been reporting under different revisions of the HS. For these reasons we prefer to use the SITC data. We also wanted to undertake some sensitivity analysis using data for earlier years, which also pushes us toward the use of the SITC data.

We collect data for 99 developing country exporters[4] and for each year we have a matrix with 3118 product rows and 102 importer columns. We exclude trade in crude petroleum and gas and also 34 specific steel products for which there is clearly a problem of consistency over time, leaving 3078 products. This can be compared with Besedes and Prusa (2006a) who investigate the exports of 27 developing countries for the longer period of 1975 and 2003 for 380 manufacturing categories (4 digit level of SITC Rev 1). Evenett and Venables (2002) decompose the export growth of 23 developing countries (to 92 importers) over 1970 to 1997 for what appears to be around 200 product categories (the "3 digit level of trade" is mentioned). Thus, in this study we utilize a dataset with a much fuller set of exporters and import markets and a more detailed commodity breakdown than

[2] While the number of countries reporting under both classifications is higher in 2002 and 2003 than in 2004, the number of reporters declines substantially in the years before 1995. The number of reporters in both 1994 and 2003 declines to 90 under the SITC and 88 under the HS.
[3] On the other hand, most countries are now collecting data at the customs level according to the HS. Thus, the data reported according to the SITC may be influenced by the revisions to the HS, although these are likely to be minimal due to the slightly higher level of aggregation of the SITC data.
[4] We exclude small island economies and middle east oil exporters. A number of other countries, typically African countries in conflict, were excluded due to obvious data problems.

in the key studies, while focusing on a shorter but more recent growth period. Our data cover on average 87 per cent of the global imports from our 99 developing country exporters reported in Direction of Trade Statistics for 2004 (after adjusting for oil). Hence, there can be a relatively high degree of confidence that the majority of trade flows from our developing country exporters are being captured by our data set.

Growth of developing country exports 1995 to 2004

Over this 10 year period exports from the 99 developing countries in our sample to the 102 import markets increased by almost 140 percent. Excluding China, exports from these developing countries grew by 107 percent. Thus, this has been a period of substantial growth in developing country exports. However, there is considerable variation across countries. Table 1 shows the growth performance by income group and then by region.

Table 1 Export growth of developing countries by income group and by region: 1995 to 2004

	Growth of exports	Minimum	Maximum	Average country growth	Dispersion of growth
Low-income	119.8	-85.7	744.7	77.4	154.7
Lower-middle income	184.6	-7.9	690.1	131.6	136.7
Upper-middle income	132.5	0.7	328.2	148.3	96.2
High Income	83.1	43.0	122.0	75.7	33.5
Africa	79.1	-85.7	471.1	49.0	103.7
S. Asia	115.1	45.6	152.8	95.3	46.8
E.Asia	146.4	38.9	744.7	190.1	200.2
LAC	105.1	-4.0	328.2	89.8	77.9
ECA	188.1	0.3	690.1	190.9	159.2
MENA	141.4	59.8	202.2	135.2	57.8

There are 38 low-income countries in the sample, 34 lower-middle-income countries, 23 upper-middle-income countries and just 4 high-income countries. The data and results for the latter should therefore be treated with circumspect. Total exports from all income groups have grown strongly but dispersion across countries tends to be higher for the lower income groups. For both the low income and lower-middle income countries the mean growth across countries is substantially below the overall growth of the group.

Our sample of countries is not evenly divided among regions. There are 34 African countries, 5 countries from South Asia, 12 East Asian countries, 21 countries from Latin

America and the Caribbean, 21 countries from Eastern Europe and Central Asia and 6 countries from North Africa (Turkey is grouped here). Note that for ECA the data may overstate export growth since Russia does not appear as an importer. Redirection of exports away from Russia to new destinations will appear as export growth. Bearing this in mind, Africa was the region that experienced the lowest growth of exports. Of the 9 countries in the sample for which exports contracted 8 are in Africa. The average growth of exports across African countries is lower than in any other region.

Decomposing export growth on the intensive and extensive margins

We decompose total export growth (the sum of exports to the 102 importers) between the two years as

Change in total exports =

(Increase in exports of existing products to current markets

- decrease in exports of existing products to current markets } Intensive Margin

- extinction of exports of existing products to current markets)

+

(new exports of existing products to new markets

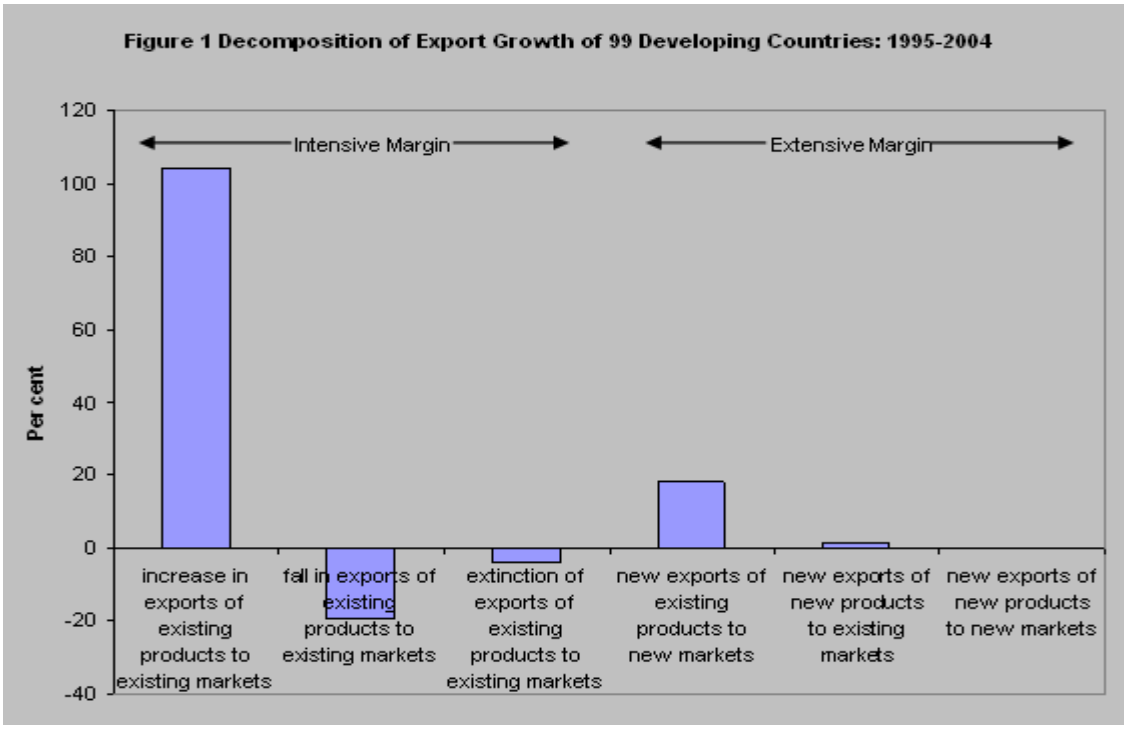
+ new exports of new products to existing markets } Extensive Margin

+ new exports of new products to new markets)

Hence, we identify the extent to which existing bilateral flows have changed; intensifying, declining or becoming extinct (appearing zeros). This we define as the intensive margin. We also identify the cause of disappearing zeros in the matrix; whether due to existing products being exported to new markets, a new product being exported to an existing market, or a new product being exported to a new market. This is defined as the extensive margin.

Figure 1 presents this decomposition for the aggregate of our 99 developing countries. This is the sum across exporters of the change in exports of each element divided by the change

in total exports of the group. Clearly, in aggregate, the contribution to growth of the intensive margin (80.4%) dominates that of the extensive margin (19.6%). What matters most of all is the intensification of existing bilateral trade flows. This accounts for about 105% of the change in exports between 1995 and 2004. This contribution to growth is offset to some extent by a decline in the intensity of some existing flows (equivalent to around 20% of total export growth) and the extinction of some flows, although this only amounted to 4% of total export growth. Within the extensive margin, it is the export of existing products to new markets that is most important, accounting for about 18% of total export growth. Evenett and Venables (2002) found that selling existing products to new markets accounted for around one third of export growth for their smaller set of developing countries. Finally, exports of new products have not been important to the recent growth of the aggregate exports of developing countries, contributing to just 1% of growth.[5]



[5] The numbers discussed here are essentially trade weighted averages of the different components of export growth. The conclusions are not sensitive to China (which has the greatest weight in our sample). The relative contribution of the different components excluding china (with that from full sample in brackets) is:

increase in exports of existing products to existing markets	104.1 (110.2)
fall in exports of existing products to existing markets	-28.1 (-19.5)
extinction of exports of existing products to existing markets	-6.3 (-4.1)
new exports of existing products to new markets	22.4 (18.2)
new exports of new products to existing markets	1.8 (1.1)
new exports of new products to new markets	0.0 (0.0)

Appendix 2 provides the results from applying the decomposition of export growth to a different period of growth to check whether these results are peculiar to this particular period of time. Unfortunately, data limitations limit the scope for investigating much earlier periods and so we settle on the period 1993 to 2002. The results from that exercise corroborate the conclusions presented above. For the group of developing countries analyzed here export growth has occurred mainly at the intensive rather than the intensive margin.

Table 2 breaks down this aggregate picture along regional lines. The importance of the intensification of existing export flows to export growth is apparent for all regions, with limited dispersion, ranging from 90 percent for Eastern Europe and Central Asia to 107 percent for Africa. The decline of existing flows is an important factor compressing overall export growth for all regions, amounting to between minus 15 to minus 22 percent of overall growth for most regions. Africa is the exception, the fall in value of certain existing trade flows reduced overall export growth by almost 40 percent. The extinction of some trade flows that existed in 1995 was less important for most regions, shrinking export growth by just 1.7 percent in East Asia to 9 percent in Latin America and the Caribbean. Again, Africa is the exception, the extinction of trade relationships between 1995 and 2004 reduced export growth by over a quarter.

With regard to positive export flows in 2004 that were zero in 1995, it is exports of existing products to new markets that dominate. These new flows contributed significantly to export growth in all regions and in every case more than offset the appearing zeros from existing flows becoming extinct. The greatest contribution to export growth from exporting existing products to new markets came in Africa, amounting to 46 percent of export growth. The smallest contribution was in East Asia where these new flows contributed around 14 percent of export growth. Exporting new products was of little importance in all regions except Africa, where the export of new products to existing markets contributed 10 percent to export growth. In none of the regions was the export of new products to new markets a source of export growth between 1995 and 2004.

Table 2 Decompostion of export growth between 1995 and 2004 by region								
	Intensive Margin			Extensive Margin				
	increase in exports of existing products to existing markets	fall in exports of existing products to existing markets	extinction of exports of existing products to existing markets	new exports of existing products to new markets	new exports of new products to existing markets	new exports of new products to new markets	Intensive	Extensive
Africa	106.9	-37.7	-25.9	46.1	10.2	0.4	43.3	56.7
MENA	92.1	-16.9	-7.6	30.1	2.4	0.0	67.6	32.4
ECA	89.8	-14.7	-7.3	29.8	2.4	0.0	67.8	32.2
LAC	105.9	-21.9	-8.8	23.1	1.6	0.0	75.2	24.8
S. Asia	104.3	-21.6	-5.0	20.8	1.5	0.0	77.7	22.3

The final columns of the table summarise the contributions to export growth from the intensive and extensive margins. For all regions, except Africa, the intensive margin contributes two-thirds or more of export growth. The extreme is Easy Asia where the extensive margin accounts for less than 15 percent of export growth. Africa appears to be an exception; the extensive margin dominates export growth.

Table 3 The contribution of the intensive and extensive margins to export growth by income group								
	Intensive Margin			Extensive Margin				
	increase in exports of existing products to existing markets	fall in exports of existing products to existing markets	extinction of exports of existing products to existing markets	new exports of existing products to new markets	new exports of new products to existing markets	new exports of new products to new markets	Intensive	Extensive
Low-income	97.6	-23.5	-8.9	28.8	5.9	0.2	65.2	34.8
Lower-middle income	96.1	-11.3	-2.3	16.5	0.9	0.0	82.6	17.4
Upper-middle income	102.6	-19.8	-6.6	22.7	1.1	0.0	76.2	23.8

Table 3 decomposes export growth for countries grouped by their level of income. For the high income countries in the sample, export growth has been dominated by the intensive margin with a high degree of turnover of exports of existing products to existing markets. New exports are relatively unimportant. Again, with only a few observations it is not possible to say whether these are results are representative of this group of countries. For low income countries the extensive margin is more important than for the other income groups. Nevertheless, growth on the intensive margin still dominates, accounting for

around two-thirds of the overall export growth of this group. Expanding exports of existing products to existing markets dominated export growth for all income groups.

The analysis above suggests that a growth strategy that ignores the scope for expanding exports at the intensive margin will miss important opportunities for export expansion. The decomposition of export growth over 1995 to 2004 for low income countries and especially for Africa, suggests that on average these countries have been more active than more advanced developing countries in introducing new export products. Besedes and Prusa (2006a) conclude that while developing countries have seen larger growth in exports at the extensive margin they have been less effective than developed countries in the performance of the intensive margin. In their more limited sample, they suggest that a critical issue for developing countries in achieving higher growth on the intensive margin is higher survival rates of trade relationships and longer trade relationships. In this exercise we have found that countries in Africa have much higher rates of decline of existing products and the highest rates of extinction.

Nonetheless, our results may reflect the success of the higher-income countries in expanding the number of export products and export markets in the past. This now enables them to concentrate on intensifying exports of existing products. Products in the intensive margin of today had to be discovered at some point. What is crucial is whether products and markets that are discovered, survive and then thrive to become drivers of growth on the intensive margin.

Exploiting the Extensive Margin

Within the confines of the trade classification used, countries that have highly diversified exports and serve many markets have less potential to increase exports at the extensive margin. What are the opportunities for lower-income countries to expand exports at the extensive margin and provide the basis for greater and future high and sustained growth of exports through expansion of the intensive margin.

In our analysis, consistent with the conclusions of Evenett and Venables (2002), export growth at the extensive margin is driven mainly by new export of existing products to new

markets. Besedes and Prusa (2006a) suggest that the opportunities for many countries to further exploit this aspect of the extensive margin are enormous. We build on this idea and construct an index of export market penetration defined as the ratio of the actual number of bilateral trade flows to potential bilateral trade flows. Formally, for exporter j, for whom I_{ij} is the set of products (i) in which positive exports are observed we define

$Y_{ijk} = 1$ for $X_{ijk}>0$ else $Y_{ijk} = 0$

and

$Z_{ik} = 1$ for $M_{ik} > 0$ else $Z_{ik} = 0$

where X_{ijk} is the value of exports of product i from exporter j to importer k, M_{ik} is the value of imports of product i by importer k. Then our index of export market penetration is given by

$$IEMP_j = \frac{\sum_{i \in I_{ij}} \sum_k Y_{ijk}}{\sum_{i \in I_{ij}} \sum_k Z_{ik}}$$

For the given range of products that a country exports, the index will be higher for countries that service a large proportion of the number of international markets that import that product. Countries that only export to a small number of the overseas markets that import the products that the country exports will have a low value of the index.

Figure 2: Export market penetration and per capita income

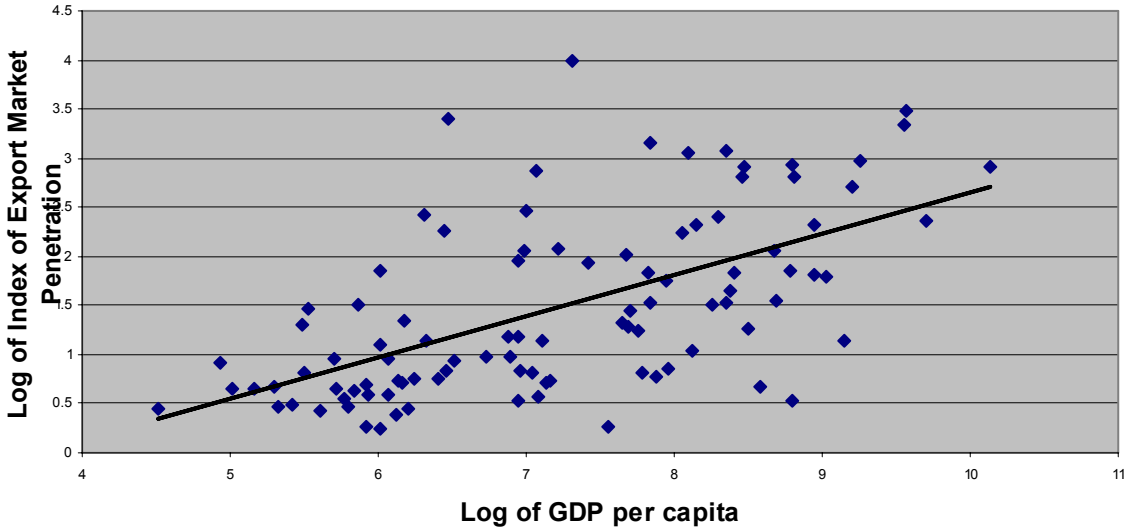


Figure 2 shows a positive correlation between the log of the index of export market penetration and the log of GDP per capita. Countries with relatively low per capita incomes tend to do less well in exploiting the available markets for the goods that they export. Table 4 shows the estimated slope of this relationship. It also shows that the positive and significant relationship between export market penetration and GDP per capita remains when we include economic size (log of GDP).[6]

Table 4: Regression results dependent variable log of index of export market penetration		
Log of GDP per capita	0.42 (0.06)	0.09 (0.04)
Log of GDP		0.38 (0.03)
Adj. R2	0.35	0.77

Table 5 gives a specific example by comparing Kenya (income per head of $480 in 2004) and Korea (income per head of $14135). The table shows that, given the constraints of the product classification used, Kenya exported 2148 products, about three-quarters of the number exported by Korea. These 2148 products generated 6789 bilateral export flows. On the other hand, Korea's 2930 exported products generated almost 67000 bilateral flows.

[6] Note that the relationship between export market penetration and relative income is robust to different thresholds of exports (we also run these regressions for an index of export market penetration for exports that exceed $10000 and also for exports in excess of $1 million).

Thus, the number of bilateral export flows of Kenya was only 10 percent of that of Korea. The next column shows the number of potential bilateral flows for the given products exported by each country. The number of potential flows for Kenya is around three-quarters of that of Korea. The final column shows the extent to which each country is exploiting the available export opportunities, the index of export market penetration. Kenya is currently exploiting less than 4 per cent of the potential bilateral flows for the products that it exports. Korea on the other hand is exploiting almost 30 percent of the available export opportunities.[7]

Table 5: Export market penetration - a comparison of Kenya and Korea

	Number of products exported in 2004	Actual number of export relationships in 2004	Potential number of export relationships in 2004	Export market penetration
Kenya	2148	6789	179426	3.78
Korea	2930	66983	237584	28.19
Ratio	73.3	10.14	75.52	

What could explain why countries such as Kenya exhibit a much lower number of bilateral trade flows for the given products that they export than countries with higher levels of income per capita? Here the recently developed model of trade with heterogeneous firms (Melitz (2003)) is useful in highlighting critical parameters that can limit the number of trade flows. In the Melitz model there is a distribution of firms within a country with differing productivities and hence marginal costs. There are fixed costs of entering markets (both the domestic and overseas markets) and there are variable trade costs that exporters must incur (such as transportation, tariffs).

For every market in the world, including the domestic market, local firms face a cut-off condition defined as the highest marginal cost at which firms can enter the market. Since sales to the domestic market do not incur trade costs the domestic cut-off marginal cost will determine the number of firms that enter the local market, conditioned by domestic demand. Exporters need not necessarily serve the local market since local demand may not exist or be sufficient. However, in activities with scale economies, producing for the

[7] Again, conclusions remain with different thresholds for exports. For example, for export flows in excess of $10000, Kenya exports about 24 per cent of the number of products exported by Korea but has only about 4 percent of the bilateral export flows. The index of export market penetration is 0.8 percent for Kenya and 14.9 percent for Korea.

domestic market may enable firms to expand output to an extent that reduces marginal costs below the threshold to export to overseas markets. Hence, policy variables that raise the fixed costs of entry into the local market and the marginal costs of selling domestically will affect the number of firms and the potential number of exporters. This points to the importance of the overall incentive regime governing investment, the business climate, labor regulations and the costs of key inputs. The latter will be determined by the trade regime and the efficiency of ports and customs for firms dependent on imported inputs as well as the provision of backbone services such as telecommunications, energy, water and finance.

Bilateral exports will be stimulated by a fall in the fixed costs of entering overseas markets and by a decline in trade costs. Fixed costs are likely to emanate from the costs of obtaining market information, in marketing in overseas markets, in producing to the standards of that market. Trade costs will arise from the costs of clearing customs and ports in the exporting and importing countries, transport costs, tariffs and other restrictions on market access, the costs of conformity assessment for the overseas market.

In a world in which firms differ in their productivities, trade costs allow low productivity firms that sell only to the domestic market to survive. Thus, a fall in trade costs induces a reallocation of resources within sectors away from low productivity firms who exit the industry towards the most productive non-exporting firms that are now able to expand through exporting and to existing high productivity exporters that can increase further overseas sales. As a result industry productivity expands and incomes rise (see Bernard et al (2005)).

Can we use these variables in a multiple regression framework to account for overall export growth? We hesitate to do so because the underlying theoretical framework is tenuous. Nonetheless, in the spirit of exploration, we set up a model in which export growth was a function of discovery (proxied here by the percentage change in the number of goods exported), diversification in the post-discovery phase into new geographic markets (proxied by the percentage change in the index of export market penetration), a measure of the incentive framework (simple average tariffs), and cost disadvantages of

exporting (the number of days to export) – controlling for economic size and level of development. The results are shown in Table 6.

Table 6: Dependent variable: Percentage change in exports 1995-2004

	Coefficients	*t Stat*	*Coefficients*	*t Stat*
Intercept	-0.118	-0.629	3.311	1.681
% change in number of goods	1.267	4.891	1.201	4.172
% change in IEMP	3.165	7.505	3.128	6.234
Ln(GDP)			-0.012	-0.140
Ln(GDP per capita)			-0.159	-1.086
Ln(Time for export (days))			-0.280	-1.219
Ln(1+Tariff)			-0.458	-2.024
Adjusted R Square	0.406		0.421	
Standard Error	1.053		1.040	
Observations	97		97	

Both the change in number of products and the change in the index of market penetration are significantly related to export performance, with the geographic diversification variable having somewhat greater association with positive performance. Both average tariffs and time to export have the predicted negative association with poor export performance. The control variables of GDP size and level of income are not significant.

These results should be interpreted with caution. The next stage of the research will have to refine the specification of all the variables. We could improve the dependent variable specification by using annual averages rather than the difference in two levels; we could refine the discovery proxies by excluding product deaths; and we could refine the incentive variables by refining tariff measures and perhaps including restrictions on services trade; and finally we could dig deeper into the cost variables.

Are there market imperfections that might justify government intervention at the extensive market in the rapid growth phases, much as Hausmann and Rodrik posit exist in the discovery phase? Indeed it is possible to hypothesize several:

- Factor market imperfections: Costs of capital may prevent sufficient expansion of supply to reach new export markets, and labor market regulations may prevent flexible deployment of labor.

- Informational asymmetries: Costs of gathering information about opportunities new export markets may be high because of few firms in a developing country export to that new market relative to competing suppliers from other countries.

- Imperfection in domestic services markets: Costs of key input services – telecommunications, transportation, and finance are often high, and in many instances owing to policy barriers to entry (e.g., state monopolies prevent entry).

- Transportation imperfections: Costs of transport may be high to third markets because low quantity of total exports from a given developing country deprives exporters of scale economies in transport. Similarly, cartel arrangements in shipping drive up prices, and more so to developing countries (see World Bank, Global Economic Prospects 2002).

Others could undoubtedly be identified. The point is that given the importance of the intensive margin any strategy for using exports to grow would be remiss if it only focused on the discovery channel.

Conclusions

While exports are an essential driver of growth in developing countries, strategies to support sustained expansion of exports are less clear. This paper has looked at whether the focus of policies to promote exports should be solely or even primarily on the discovery phase of the export cycle. The argument given in the literature has been based on the view that the principal market failures in the export process have been located in the discovery phase. These take the form of "super-easy entry" that imply imitators jump into profitable export markets following the lead of pioneers and immediately compete away returns to the discovery efforts of pioneers – leading to systemic underinvestment in discovery and slow growth.

While there are reasons to continue to test this hypothesis, this paper sought to locate the discovery phase in a broader context of export growth by looking at the role of subsequent

phases of the export cycle, quantifying them, and examining the relative performance of developing countries in those phases.

Our decomposition of export growth over the period 1995-2004 shows that exports of developing countries have been driven primarily by growth at the intensive margin, that is, the expansion of existing trade flows to existing markets. Within the intensive margin, lagging countries – those with slow export growth – appear to experience a greater rate of product death than countries with superior export performance, a phenomenon that we know little about. It is probable that firms that managed to maintain export market share in the face of increasing global competition did so through some combination of quality improvements and productivity growth.

At the extensive margin, the introduction of new products is quite small in comparison with growth in the export of existing products to new markets. Said, differently, products exported in 2004 that were not exported in 1995 contributed little to the export growth of developing countries as a group. For low-income countries and for Africa, growth into new markets at the extensive margin is more important than for other countries and regions.

Focusing on the complete export cycle merits policy attention. We suggest a strategy of export growth should include proactive policies focused not solely or even primarily on the discovery channel, but also include efforts on subsequent phases of the export cycle. This calls for more attention to policies that facilitate trade and improve competitiveness. The following suggests three critical elements of a broad framework in which to assess the range of issues that affect countries ability to compete in international markets:

- *The incentives regime.* A key challenge for policy makers is to ensure that domestic resources are channeled to their most productive activities. This requires a careful analysis of the structure of incentives in the economy to ensure that land, labor, capital and technology are moving to a) sectors in which the country has a long-term capacity to compete and b) to the most productive firms within sectors. This necessitates a clear understanding of how trade, tax, the business environment and

labor market policies interact to affect investment, output and trade decisions. In many small low income countries the economy tends to be dominated by a small number of sectors, so that many of the key issues regarding the allocation of resources can be unearthed by analysis that focuses on these sectors. Especially more are to identify policy barriers to competition in factor markets that affect adversely the decision to export and that raise costs of exports.

- *Lowering the costs of backbone services.* Of great importance in today's globalised economy is that domestic firms have access to efficiently produced critical backbone services inputs. Firms that have to pay more than their competitors for energy, telecommunications, transport and logistics, finance and security will find it hard to compete in both the domestic and overseas markets. Reducing policy barriers to competition and improving regulatory effectiveness in these services industries lies at the heart of the policy challenge. In many developing countries lack of infrastructure is a critical constraint on the availability and cost of backbone services. Other critical services are those related to education and training that are necessary to ensure supply of the type of labor required by the more productive expanding sectors in the economy and to foster a process by which value is increasingly added to the products and services produced in the country.

- *Pro-active policies to support trade.* Both market and government failures tend to afflict countries as they seek to expand exports and growth. In many cases these constraints to competitiveness require specific interventions and institutions. In identifying the role of product deaths and weak performance in the index of export market penetration this study underscores the importance of export promotion agencies – and even economic officers in foreign embassies – in overcoming informational asymmetries that impede the search for third markets. Also of importance are likely to be investment promotion agencies, standards bodies, customs and agencies to support innovation and clustering. In tackling government failures and weak capacity for policy formulation and implementation, effective mechanisms can be to establish an empowered and dedicated trade and competitiveness policy unit within government, export processing zones and duty

refund schemes. It is important that these initiatives are brought together within a strategy for competitiveness rather than as a series of ad hoc interventions. In isolation these agencies tend to be rather weak and ineffective.

This paper opens up other interesting questions of research on diversification. As an immediate priority it would be useful to deepen the current findings to ensure robustness. Beyond this, the paper has not teased out distinctions within the post-discovery phase, but these could be important. At the intensive margin, have successful countries performed well because during the mature stage of a product they have invested in raising quality and introducing differentiation that allows them to exploit the intensive margin? At what stage in the export cycle did firms choose to seek out new geographic markets – at a point when growth in existing markets began to slow or in an earlier acceleration phase? Also, the findings on product deaths merit closer scrutiny and might be amenable to policy remedies. Why do low-income countries, with apparent success in the discovery phase of the export cycle, experience a greater rate of premature product demise? A recent paper (Besedes and Prusa, 2006b) argues that sustaining growth in the first two to four years is crucial for moving into the acceleration phase. All of this suggests that watching more than the discovery channel might lead to a more comprehensive policy vision.

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Appendix 1: Country Coverage

Developing Country Exporters

Low-income	Lower-middle income	Upper-middle income	High Income
Bangladesh	Albania	Argentina	Korea
Benin	Algeria	Chile	Singapore
Burkina Faso	Angola	Costa Rica	Slovenia
Burundi	Armenia	Croatia	Taiwan
Cambodia	Azerbaijan	Czech Republic	
Central African Republic	Bolivia	Equatorial Guinea	
Chad	Brazil	Estonia	
Ethiopia	Bulgaria	Gabon	
Gambia	Cameroon	Hungary	
Ghana	Cape Verde	Latvia	
Guinea	China	Lithuania	
Guinea Bissau	Colombia	Malaysia	
India	Dominican Republic	Mauritius	
Kenya	Ecuador	Mexico	
Kyrgyz Republic	Egypt	Panama	
Laos	El Salvador	Poland	
Madagascar	Georgia	Romania	
Malawi	Guatemala	Slovakia	
Mali	Guyana	South Africa	
Mauritania	Honduras	Trinidad	
Mongolia	Indonesia	Turkey	
Mozambique	Jamaica	Uruguay	
Nepal	Jordan	Venezuela	
Niger	Kazakhstan		
Nigeria	Morocco		
Pakistan	Nicaragua		
Rwanda	Paraguay		
Sao Tome	Peru		
Senegal	Philippines		
Sierra Leone	Sri Lanka		
Sudan	Thailand		
Tajikistan	Tunisia		
Tanzania	Turkmenistan		
Togo	Ukraine		
Uganda			
Uzbekistan			
Vietnam			
Zambia			

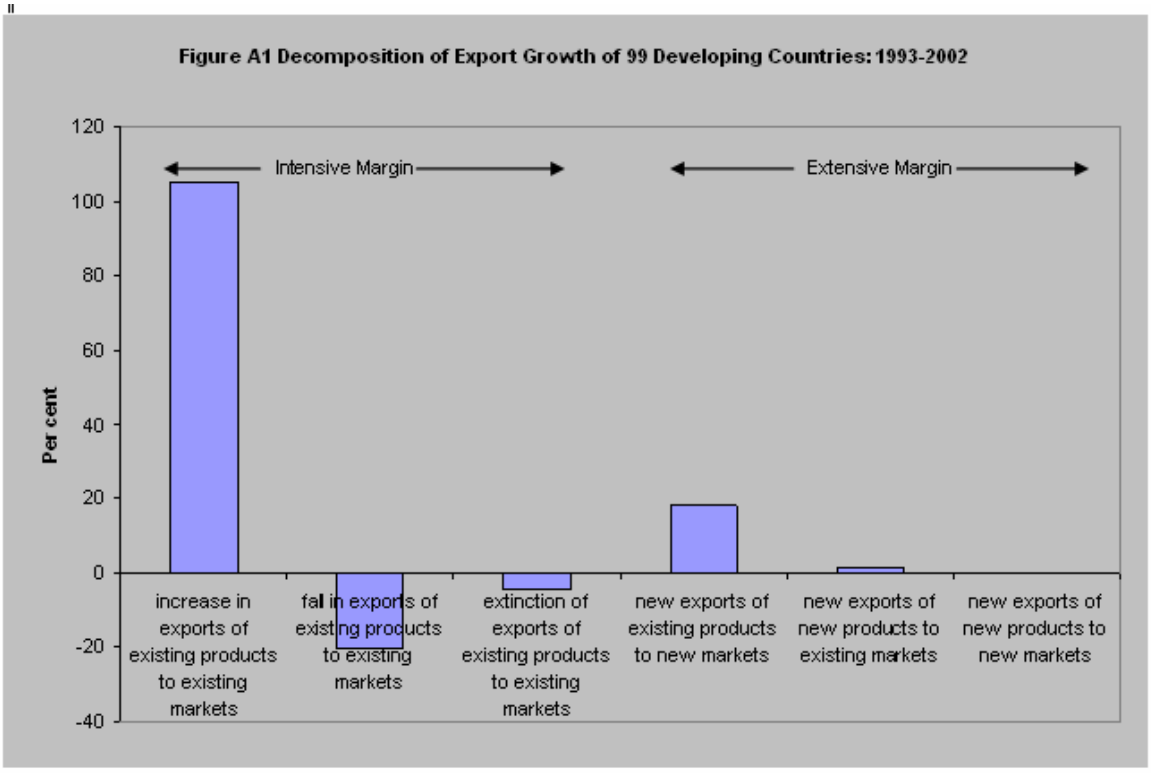
Importing Countries

Algeria, Argentina, Australia, Austria, Bahrain, Bangladesh, Barbados, Belgium and Luxembourg, Bolivia, Brazil, Burkina Faso, Burundi, Cameroon, Canada, Chile, China, Colombia, Costa Rica, Croatia, Cyprus, Czech Republic, Denmark, Dominica, Ecuador, Egypt, El Salvador, Estonia, Finland, France, Gambia, Germany, Greece, Guatemala, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Japan, Jordan, Kazakhstan, Kenya, Rep of Korea, Kyrgyz Republic, Latvia, Lithuania, Macao, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Malta, Mauritius, Mexico, Moldova, Morocco, Netherlands, New Zealand, Nicaragua, Norway, Oman, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Portugal, Qatar, Romania, Saudi Arabia, Seychelles, Singapore, Slovak Republic, Slovenia, South Africa, Spain, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Sudan, Sweden, Switzerland, Taiwan, Tanzania, Thailand, Togo, Trinidad and Tobago, Tunisia, Turkey, Uganda, United Kingdom, United States, Uruguay, Venezuela, Zambia, Zimbabwe

Appendix 2. Decomposition of export growth over a different time period

To help assess the robustness of the results discussed above we applied the decomposition of exports to a different period. We want to maintain the same developing country exporters but moving to an earlier growth period reduces the number of import reporting countries. We chose a period close to that used in the main exercise to maintain a large sample and chose the period 1993 to 2002, for which there are 78 reporting importers.

The figure below shows that the broad conclusions from the main analysis are replicated in this different growth period. The main driver of export growth for the developing countries in the sample was the increase in exports of existing products to existing markets. Growth at the intensive margin again dominates growth of the extensive margin. Within the latter it is exports of existing products to new markets that is most important. Products that were not exported in 1993 that were exported in 2002 did not contribute significantly to export growth.



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